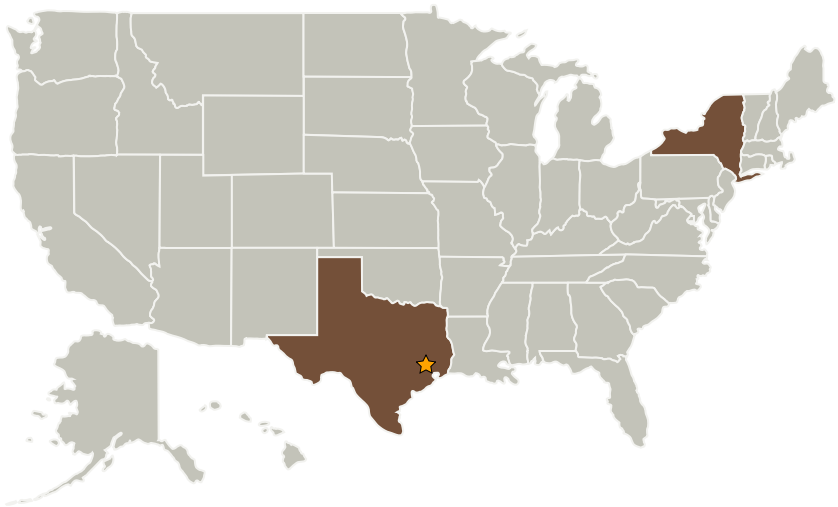
A 3-D Miniature LIDAR System for Mobile Robot Navigation, Phase II

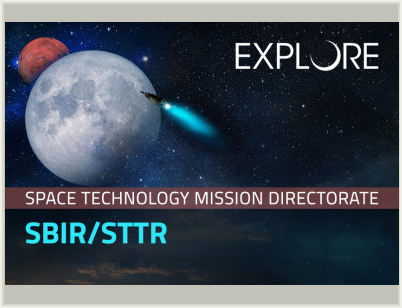
Completed Technology Project (2009 - 2011)

Project Introduction

Future lunar site operations will benefit from mobile robots, both autonomous and tele-operated, that complement or replace human extravehicular activity. Three-dimensional sensing technology is at the heart of such functionality, enabling reliable navigation in complex, dynamic environments, and serving as a valuable tool for inspection and site survey. Honeybee Robotics is therefore developing a small-envelope, high-performance scanning LIDAR system, geared primarily towards robotic navigation and secondarily to site inspection and survey. The proposed Phase II will draw on the results of a DARPA-funded design study and Phase I of this effort, which resulted in successful proof-of-concept, as well as testbeds and proprietary software tools. The Honeybee 3D Miniature LIDAR (3DML) uses a novel scanning mechanism in conjunction with a pulse-time-of-flight optical rangefinding subsystem. The 3DML architecture, developed with expert input from Sensor Designs, an electro-optical systems consultancy, achieves wide field of view and high resolution while maintaining ultra-compact package size. The proposed Phase II will include development of a functional brassboard system prototype and its integration and test on a K10 research rover. Phase III will pursue a multi-pronged commercialization effort, including preflight development, production of a unit for terrestrial research, and incorporation of 3DML into a flight program.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Honeybee Robotics, Ltd.	Supporting Organization	Industry	Pasadena, California

Primary U.S. Work Locations	
New York	Texas

Project Transitions

February 2009: Project Start

June 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.1 Sensing and Perception
    - TX04.1.1 Sensing for Robotic systems